

INTISARI

Latar belakang: *Catheter-associated Urinary Tract Infection* (CAUTI) pada pasien di *Intensive Care Unit* (ICU) merupakan salah satu *Healthcare-associated Infection* yang menyebabkan peningkatan lama rawat, biaya kesehatan, morbiditas dan mortalitas. CAUTI pada pasien ICU banyak disebabkan oleh mikroorganisme resisten antimikroba dan pembentuk biofilm, hal ini berhubungan dengan infeksi rekuren dan persisten.

Tujuan Penelitian: Penelitian ini menganalisis patogen dan pola patogen, pola kepekaan, dan kemampuan pembentukan biofilm uropatogen penyebab CAUTI pasien di ICU RSUP Dr. Sardjito dan RS Akademik UGM Yogyakarta.

Metode: Penelitian ini merupakan penelitian deskriptif dengan teknik potong lintang (*cross sectional*). Subjek penelitian ini adalah pasien pengguna kateter urine lebih dari 48 jam dengan kecurigaan CAUTI yang dirawat di ICU RSUP dr. Sardjito dan RS Akademik UGM Yogyakarta. Spesimen pada penelitian ini adalah isolat bakteri dan *yeast* hasil kultur urine pasien dengan kecurigaan CAUTI di ICU RSUP Dr. Sardjito dan RS Akademik UGM Yogyakarta. Semua isolat bakteri dan isolat *yeast* dari RS Akademik UGM diidentifikasi dan diuji kepekaan dengan *Vitek 2 Compact System*. Isolat *yeast* dari RSUP Dr. Sardjito diidentifikasi dengan CHROMagar *Candida* dan dilakukan uji kepekaan dengan metode *microdilution broth*. Uji kemampuan pembentukan biofilm mikroorganisme dilakukan dengan *Microtiter Plate Assay*. Pemeriksaan struktur biofilm pada kateter urine dilakukan dengan *Scanning Electrone Microscope*.

Hasil Penelitian: Terdapat 49 isolat bakteri dan 28 isolat *yeast* yang diisolasi. Mikroorganisme terbanyak adalah *E. coli* (15,6%), *A. baumannii* (13,0%), *C. albicans* (11,7%), *C. tropicalis* (10,4%), *E. faecium* (10,4%), *E. faecalis* (9,1%), *C. krusei* (6,5%), *P. aeruginosa* (6,5%), *Candida spp.* (5,2%), *K. pneumoniae* (2,6%), *E. cloacae* (2,6%), *B. cepacia* (1,3%), *C. parapsilosis* (1,3%), *C. glabrata* (1,3%), *S. aureus* (1,3%), dan *S. hamolyticus* (1,3%). Bakteri yang diisolasi pada penelitian ini menunjukkan tingkat resistensi tinggi terhadap berbagai golongan antibiotik. Sebanyak 62,5% dari isolat *Enterobacterales* merupakan penghasil ESBL, 90% dari isolat *A. Baumannii* resisten terhadap Karbapenem, 20% dari isolat *P.aeruginosa* resisten terhadap Karbapenem. Sedangkan *yeast Candida* yang diisolasi pada penelitian ini menunjukkan tingkat sensitivitas cukup baik terhadap berbagai antifungal. 91,8% dari isolat bakteri dan 100% dari isolat *yeast Candida* mampu membentuk biofilm. Pemeriksaan biofilm pada kateter urine menunjukkan struktur biofilm, matriks *Extracellular Polymeric Substance* (EPS), dan didapatkan kesesuaian bentuk bakteri pada kultur urine dan biofilm kateter urine.

Kesimpulan: *E.coli*, *A. baumannii*, dan *C. albicans* merupakan mikroorganisme patogen penyebab infeksi biofilm pada pasien CAUTI yang paling banyak ditemukan. Mayoritas mikroorganisme patogen penyebab CAUTI memiliki kemampuan pembentukan biofilm.

Keywords: infeksi saluran kemih, CAUTI, biofilm, *multidrug-resistant*, *Scanning Electrone Micsroscope*

ABSTRACT

Background: Catheter-associated urinary tract infection in Intensive Care Unit patients is one of the healthcare-associated infections with increased length of stay, healthcare costs, morbidity, and mortality. CAUTI is largely caused by antimicrobial-resistant microorganisms and biofilm formers, associated with recurrent and persistent infections.

Aim of the study: to analyze the pathogens, antimicrobial sensitivity patterns, and biofilm formation capabilities of microorganisms that cause CAUTI in ICU patients at Sardjito Hospital and UGM Academic Hospital Yogyakarta.

Method: This research is a descriptive study with cross-sectional technique. The subject of this study includes patients who have used urinary catheters for more than 48 hours with suspected CAUTI in the ICU at RSUP Dr. Sardjito and UGM Academic Hospital, Yogyakarta. Bacterial and yeast isolates were obtained from urine culture of patients suspected of CAUTI in the ICU of RSUP, Dr. Sardjito and RS Akademik UGM Yogyakarta. All bacterial isolates and yeast isolates from UGM Academic Hospital were identified and tested for sensitivity using the Vitek 2 Compact System. Yeast isolates from Sardjito Hospital were identified using CHROMagar Candida and tested for sensitivity using the microdilution broth method. The biofilm formation ability of microorganisms were tested with a microtiter plate assay. The biofilm structure on the urinary catheter were examined using a scanning electron microscope.

Results: There are 49 bacterial isolates and 28 yeast isolates that have been isolated. The most abundant microorganisms are *E. coli* (15.6%), *A. baumannii* (13.0%), *C. albicans* (11.7%), *C. tropicalis* (10.4%), *E. faecium* (10.4%), *E. faecalis* (9.1%), *C. krusei* (6.5%), *P. aeruginosa* (6.5%), *Candida spp.* (5.2%), *K. pneumoniae* (2.6%), *E. cloacae* (2.6%), *B. cepacia* (1.3%), *C. parapsilosis* (1.3%), *C. glabrata* (1.3%), *S. aureus* (1.3%), and *S. hamolyticus* (1.3%). The bacteria isolated in this study showed a high level of resistance to various groups of antibiotics. As many as 62.5% of Enterobacterales isolates are ESBL producers, 90% of *A. Baumannii* isolates are Carbapenem-resistant, and 20% of *P. aeruginosa* isolates are Carbapenem-resistant. Meanwhile, the *Candida* yeast isolated which are dominate by *C. albicans* and *C. krusei* in this study showed a fairly good level of sensitivity to various antifungals. 91.8% of bacterial isolates and 100% of *Candida* yeast isolates were able to form biofilms. Examination of the biofilm on the urinary catheter showed the biofilm structure, matrix, and a match in bacterial morphology between the urine culture and the urinary catheter biofilm.

Conclusion: *E. coli*, *A. baumannii*, and *C. albicans* are the most commonly found pathogenic microorganisms causing biofilm infections in CAUTI patients. Majority of uropathogens that cause CAUTI have the ability to produce biofilm.

Keywords : urinary tract infection, CAUTI, biofilm, multidrug-resistant, scanning electron microscope